

Original Research Article - Variation in the branching pattern of the 3rd part of axillary artery

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Abstract

Axillary artery is the principal artery of the upper limb. It is also the axis artery of the upper limb. Its normally divided into 3 parts by the pectoralis minor muscle. There are many known variations of the third part of axillary artery. The study was conducted in the dept of Anatomy JJMMC and SIMS & RC between 2011 – 2015 [5 years] on cadavers. The present case was found in a male cadaver aged around 60years. During the routine cadaveric dissection of undergraduate students we found that 3rd part of axillary artery divided into subscapular artery and common trunk which in turn gave origin to other branches of upper limb. The subscapular artery gave rise to circumflex scapular artery, thoracodorsal artery and posterior circumflex humeral artery. The common trunk on the other hand gave origin to anterior circumflex artery, nutrient artery of humerus, profunda brachii artery, superior and inferior ulnar collateral arteries. The knowledge of such type of variation is important for surgeons, orthopedicians and interventional radiologists who operate in this region.

Keywords: Axillary artery, Subscapular artery Common trunk

Introduction

Axillary artery is the continuation of the subclavian artery which extends between outer border of first rib to the lower border of the teres major muscle where it continues as brachial artery. [1] It is divided into three parts by the presence of pectoralis minor muscle. First part gives rise to superior thoracic artery, second part gives thoracoacromial artery and lateral thoracic artery Third part gives rise to subscapular, anterior and posterior circumflex humeral arteries [1].

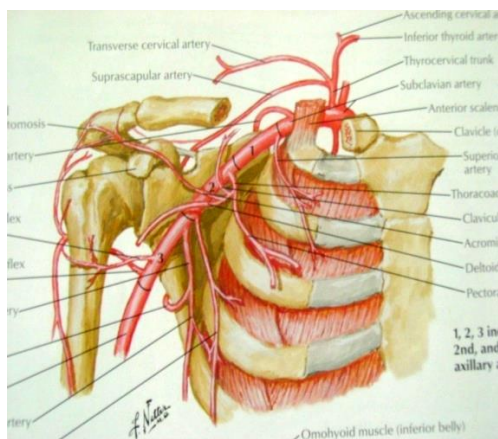


Fig 1: Showing the normal course, 3 parts and branches of the Axillary artery.

Materials and Methods

The study was conducted in the dept of Anatomy JJMMC and SIMS & RC between 2011 – 2015[5 years] including 25 cadavers (n -- 50). In a male cadaver aged around 60 years we found a rare and unusual type of branching pattern of third part of axillary artery in the left upper limb. The variation was studied and photographs were taken accordingly. The right

upper limb of the same cadaver was dissected and no such variations were found.

Results

The third part of axillary artery in the left upper limb gave rise to only two branches instead of the standard three branches as described in all the textbooks.

The branches were

1. Subscapular artery,
2. Common trunk from third part of Artery – which gave rise to 5 branches described later

Later to giving the branches the third part of axillary artery continued in the arm as the brachial artery proper. At the cubital fossa it terminated by dividing into radial and ulnar arteries and continued in the forearm with normal course and branches.

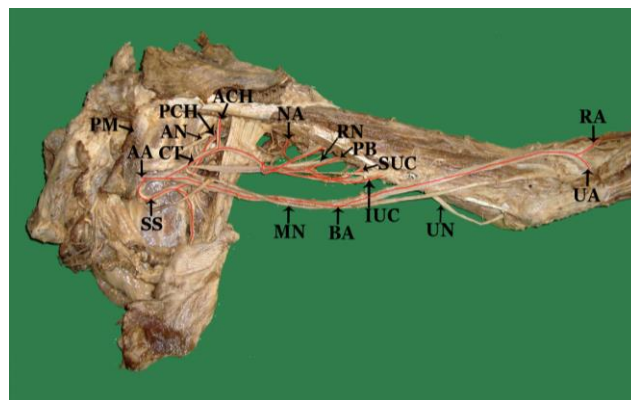


Fig 2: Photograph showing the 3rd part of Axillary artery with the variations.

[**Abbreviations:** PM – Pectoralis major, AA – Axillary artery, SS – Subscapular artery, CT – Common trunk, ACH – Anterior circumflex humeral artery, PCH – Posterior Circumflex humeral artery, NA – Nutrient artery, PB – Profunda brachii artery, SUC – Superior ulnar collateral artery, IUC – Inferior ulnar collateral artery, BA – Brachial artery, UA - Ulnar artery, RA – Radial artery, AN – Axillary nerve, RN – Radial nerve, MN – Median nerve, UN – Ulnar nerve.] Findings in the specimen were:

A. Subscapular artery: took origin 6 cms above the distal border of Teres major, from third part of Axillary artery.

It gave rise to three branches

1. Circumflex Scapular artery.
2. Thoraco dorsal artery.
3. Posterior circumflex humeral artery. (This runs back with the axillary nerve through a quadrangular space).

B. Common trunk: took origin 5 cm above the distal border of teres major.

It gave rise to 5 branches,

1. Anterior circumflex humeral artery.
2. Nutrient artery of humerus.
3. Profunda brachii artery.
4. Superior ulnar collateral artery.
5. Inferior ulnar collateral artery.

Out of the branches given off by the common trunk last 4 branches are normally branches of brachial artery. Brachial artery in this specimen was having a normal course and divided at the cubital fossa into radial and ulnar arteries and continued in the forearm. The right upper limb of the same cadaver was dissected and no such variations were observed in it.

Discussion

The variation in the axillary artery is quite common, also “the brachial artery shows many variations rather than the normal pattern and variation is a rule rather than exception.” Study by Bergmann *et al.*, [2] states that branches of the axillary artery are subject to great variation. Different types of variations in the third part of axillary artery are

- Two circumflex artery may arise from a common trunk, together with the profunda brachii artery without the subscapular artery.
- Third part of axillary artery may give rise to a common trunk, from which Subscapular artery, anterior and posterior circumflex humeral artery, profunda brachii and ulnar collateral arteries arises.

Ramesh rao and workers [3] showed that, the third part of axillary artery gave rise to a common trunk from which, subscapular artery, anterior and posterior circumflex humeral artery, profunda brachii and ulnar collateral artery takes origin. Third part of axillary artery dividing into superficial and deep brachial artery was reported in one of the cadaver which was reported by the same authors in one of their earlier publications.

Vijaybhaskar and others [4] reported that third part of axillary artery divided into superficial brachial artery and deep brachial

artery. Out of which superficial brachial artery continued in the arm without giving any branches and ended in the cubital fossa dividing into radial and ulnar artery. Deep brachial artery gave rise to subscapular artery, profunda brachii artery, articular branches to shoulder joint, anterior and posterior circumflex humeral artery [4]

Similar type of findings of Safiye and workers [5] who have described that the third part of the axillary artery dividing into superficial & deep brachial arteries in the Turkish population. Satabdi Sarkar [6] and workers have found a variation in the third part of axillary artery where anterior circumflex artery and common trunk were seen and from the common trunk 4 branches were given off supplying the arm.

Embryological Basis

During the embryogenesis the lateral branch of the 7th cervical intersegmental artery becomes enlarged to form the axial artery of the upper limb which on further development becomes a) axillary artery, b) brachial artery, c) proximal part of ulnar artery between the levels of origin of radial and common interosseous arteries, d) common interosseous artery and e) anterior interosseous artery [7].

According to Arey [8], explanations for the unusual blood vessels may be due to:

The choice of unusual paths in the primitive vascular plexuses. The persistence of vessels normally obliterated in the course of development. The disappearance of vessels normally Retained. Incomplete development and fusions and absorption of the parts usually distinct.

Conclusion

Anomalies in the origin and course of the principal arteries are having practical importance for the surgeons, orthopedicians and interventional radiologists who are operating in this region. In axillary approach to chronic dislocation of the shoulder joint the incision is transverse and it may injure the branches of the brachial artery [9]. Brachial plexus injury is a common condition which requires exploration and repair. During surgery the abnormal branch may be a definite cause of concern if its presence is not kept in mind [10] Therefore the knowledge of such type of variation is important for accurate diagnostic interpretation for the radiologists and therapeutic intervention.

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